US 20200184660A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2020/0184660 A1**

Shi et al. (43) **Pub. Date: Jun. 11, 2020**

(54) **UNSUPERVISED DEFORMABLE REGISTRATION FOR MULTI-MODAL IMAGES**

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(21) Appl. No.: **16/428,092**

(22) Filed: **May 31, 2019**

Related U.S. Application Data

(60) Provisional application No. 62/777,837, filed on Dec. 11, 2018.

Publication Classification

(51) **Int. Cl.**
G06T 7/30 (2006.01)

(52) **U.S. Cl.**
CPC ***G06T 7/30*** (2017.01); *G06T 2207/20081* (2013.01); *G06T 2207/10088* (2013.01); *G06T 2207/20084* (2013.01); *G06T 2207/10104* (2013.01); *G06T 2207/10132* (2013.01); *G06T 2207/30068* (2013.01); *G06T 2207/10081* (2013.01)

(57) **ABSTRACT**

In order to reduce computation time and provide more accurate solutions for bi-directional, multi-modal image registration, a learning-based unsupervised multi-modal deformable image registration method that does not require any aligned image pairs or anatomical landmarks is provided. A bi-directional registration function is learned based on disentangled shape representation by optimizing a similarity criterion defined on both latent space and image space.